CLAIMS

1. A protein (C) or (D):

(C) a protein having an amino acid sequence described in SEQ ID NO: 15 of the Sequence Listing,

(D) a protein consisting of an amino acid sequence that includes substitution, deletion, insertion, addition or inversion of one or a plurality of amino acids in the amino acid sequence described in SEQ ID NO: 15 of the Sequence Listing, and has activity to produce a dipeptide from an L-amino acid ester and an L-amino acid.

2. A protein (E) or (F):

(E) a protein having an amino acid sequence described in SEQ ID NO: 17 of the Sequence Listing,

(F) a protein consisting of an amino acid sequence that includes substitution, deletion, insertion, addition or inversion of one or a plurality of amino acids in the amino acid sequence described in SEQ ID NO: 17 of the Sequence Listing, and has activity to produce a dipeptide from an L-amino acid ester and an L-amino acid.

3. A DNA (c) or (d):

(c) a DNA consisting of a base sequence consisting of bases numbers 486 to 1496 in a base sequence described in SEQ ID NO: 14 of the Sequence Listing,

(d) a DNA that hybridizes under stringent conditions with a DNA consisting of a base sequence complementary to a base sequence

consisting of bases numbers 486 to 1496 in the base sequence described in SEQ ID NO: 14 of the Sequence Listing, and encodes a protein having activity to form a dipeptide from an L-amino acid ester and an L-amino acid.

4. A DNA (e) or (f):

(e) a DNA consisting of a base sequence consisting of bases numbers 311 to 1279 in a base sequence described in SEQ ID NO: 16 of the Sequence Listing,

(f) a DNA that hybridizes under stringent conditions with a DNA consisting of a base sequence complementary to a base sequence consisting of bases numbers 311 to 1279 in the base sequence described in SEQ ID NO: 16 of the Sequence Listing, and encodes a protein having activity to form a dipeptide from an L-amino acid ester and an L-amino acid.

5. The DNA according to claim 3, wherein the stringent conditions are conditions under which washing is carried out at 60°C and at a salt concentration equivalent to 1×SSC and 0.1% SDS.

6. The DNA according to claim 4, wherein the stringent conditions are conditions under which washing is carried out at 60°C and at a salt concentration equivalent to 1×SSC and 0.1% SDS.

7. A recombinant DNA comprising incorporated therein the DNA

according to claim 3.

8. A recombinant DNA comprising incorporated therein the DNA according to claim 4.

9. A recombinant DNA comprising incorporated therein the DNA according to claim 5.

10. A recombinant DNA comprising incorporated therein the DNA according to claim 6.

11. A transformed cell comprising incorporated therein the DNA according to claim 3 in a state where the DNA is able to express a protein encoded thereby.

12. A transformed cell comprising incorporated therein the DNA according to claim 4 in a state where the DNA is able to express a protein encoded thereby.

13. A transformed cell comprising incorporated therein the DNA according to claim 5 in a state where the DNA is able to express a protein encoded thereby.

14 A transformed cell comprising incorporated therein the DNA according to claim 6 in a state where the DNA is able to express a

protein encoded thereby.

15. A method for producing a dipeptide-forming enzyme, comprising: culturing the transformed cells according to claim 11 in a medium, and accumulating a protein having activity to produce the dipeptide from an L-amino acid ester and an L-amino acid in the medium and/or in the transformed cells.

16. A method for producing a dipeptide-forming enzyme, comprising: culturing the transformed cells according to claim 12 in a medium, and accumulating a protein having activity to produce the dipeptide from an L-amino acid ester and an L-amino acid in the medium and/or in the transformed cells.

17. A method for producing a dipeptide-forming enzyme, comprising: culturing the transformed cells according to claim 13 in a medium, and accumulating a protein having activity to produce the dipeptide from an L-amino acid ester and an L-amino acid in the medium and/or in the transformed cells.

18. A method for producing a dipeptide-forming enzyme, comprising: culturing the transformed cells according to claim 14 in a medium, and accumulating a protein having activity to produce the dipeptide from an L-amino acid ester and an L-amino acid in the medium and/or in the transformed cells.

19. A method for producing a dipeptide, comprising: producing a dipeptide from an L-amino acid ester and an L-amino acid using a protein having activity to form the dipeptide from an L-amino acid ester and an L-amino acid that is produced in the transformed cells according to claim 11.

20. A method for producing a dipeptide, comprising: producing a dipeptide from an L-amino acid ester and an L-amino acid using a protein having activity to form the dipeptide from an L-amino acid ester and an L-amino acid that is produced in the transformed cells according to claim 12.

21. A method for producing a dipeptide, comprising: producing a dipeptide from an L-amino acid ester and an L-amino acid using a protein having activity to form the dipeptide from an L-amino acid ester and an L-amino acid that is produced in the transformed cells according to claim 13.

22. A method for producing a dipeptide, comprising: producing a dipeptide from an L-amino acid ester and an L-amino acid using a protein having activity to form the dipeptide from an L-amino acid ester and an L-amino acid that is produced in the transformed cells according to claim 14.

23. The method for producing a dipeptide according to claim 19, wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester, an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

24. The method for producing a dipeptide according to claim 20, wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester, an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

25. The method for producing a dipeptide according to claim 21, wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester,

an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

26. The method for producing a dipeptide according to claim 22, wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester, an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

27. The method for producing a dipeptide according to claim 19, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

28. The method for producing a dipeptide according to claim 20, wherein the L-amino acid is one or more types selected from the group

consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

29. The method for producing a dipeptide according to claim 21, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

30. The method for producing a dipeptide according to claim 22, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

31. The method for producing a dipeptide according to claim 23, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

32. The method for producing a dipeptide according to claim 24, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

33. The method for producing a dipeptide according to claim 25, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

34. The method for producing a dipeptide according to claim 26, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

35. A method for producing a dipeptide comprising: allowing a protein having proline iminopeptidase activity to act on an L-amino acid ester and an L-amino acid to form the dipeptide.

36 The method for producing a dipeptide according to claim 35, wherein the protein having proline iminopeptidase activity is derived from a microbe belonging to genus *Corynebacterium*, *Pseudomonas* or *Bacillus*.

37 The method for producing a dipeptide according to claim 35, wherein the protein having proline iminopeptidase activity is derived from any of *Corynebacterium glutamicum*, *Pseudomonas putida* and *Bacillus coagulans*.

38. The method for producing a dipeptide according to claim 35 wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester, an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

39. The method for producing a dipeptide according to claim 36 wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester,

an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

40. The method for producing a dipeptide according to claim 37 wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester, an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

41 The method for producing a dipeptide according to claim 35, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

42 The method for producing a dipeptide according to claim 36, wherein the L-amino acid is one or more types selected from the group

consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

43 The method for producing a dipeptide according to claim 37, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

44 The method for producing a dipeptide according to claim 38, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

45 The method for producing a dipeptide according to claim 39, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

46 The method for producing a dipeptide according to claim 40, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.

47. A method for producing a dipeptide, comprising: producing the dipeptide from an amino acid ester and an amino acid using a culture of a microbe belonging to the genus *Corynebacterium*, *Pseudomonas* or *Bacillus* and having the ability to produce the dipeptide from the amino acid ester and the amino acid, microbial cells isolated from the culture or a treated microbial product of the microbe.

48 The method for producing a dipeptide according to claim 47, wherein the L-amino acid ester is one or more types selected from the group consisting of an L-alanine ester, a glycine ester, an L-valine ester, an L-isoleucine ester, an L-methionine ester, an L-phenylalanine ester, an L-serine ester, an L-threonine ester, an L-glutamine ester, an L-tyrosine ester, an L-arginine ester, an L-aspartic acid-α-ester, an L-aspartic acid-β-ester, an L-leucine ester, an L-asparagine ester, an L-lysine ester, an L-aspartic-α,β-dimethyl ester and an L-glutamine-γ-ester.

49 The method for producing a dipeptide according to claim 47, wherein the L-amino acid is one or more types selected from the group consisting of L-glutamine, L-asparagine, glycine, L-alanine, L-leucine, L-methionine, L-proline, L-phenylalanine, L-tryptophan, L-serine, L-threonine, L-tyrosine, L-lysine, L-arginine, L-histidine and L-glutamate.